REMARKS

Claims 1-10 and 25 remain in the application with claim 1 in independent form. No claims are presently amended, cancelled, or added. Claims 11-18 were previously cancelled as non-elected claims that were subject to a Restriction Requirement. Claims 19-24 were also previously cancelled.

Claims 1, 2, 6-10, and 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kolluri (PCT Publication No. WO98/10116) in view of Roth et al. (USPN 5414324). Claims 3-5 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kolluri in view of Roth et al. as applied to claim 1, and further in view of either Rickerby et al. (USPN 6,176,982) or O'Reilly et al. (PCT Publication No. WO02/35576). Claims 1-10 and 25 stand provisionally rejected under the judicially-created doctrine of obviousness-type double patenting over copending U.S. App. No. 10/510555. The Applicants respectfully maintain the position that the rejections based upon the combined teachings of Kolluri and Roth et al. are improper on the basis that one of skill in the art would **not** have arrived at the instant invention based on the knowledge obtained as a result of the combined teachings thereof. The Applicants respectfully request the Examiner to reconsider these rejections in view of the additional comments below that are intended to supplement the arguments made in the Response filed on June 18, 2008.

The Applicants previously provided extensive evidence, as well as arguments, for purposes of establishing **how a person of ordinary skill would have understood the teachings of Kolluri, and what a person of ordinary skill would have known or could have done with the teachings of Kolluri in view of the further teachings of Roth et al.**

In response to the Applicants' prior arguments, the Examiner has maintained the rejections that rely upon the combination of Kolluri and Roth et al. To support maintenance of the rejections, the Examiner has opined that the teachings of Exhibit A to Park et al. are not commensurate in scope with the instant claims. The Examiner has also opined that the Declaration executed by Dr. Andrew Goodwin and provided by the Applicants (which was originally filed for a related application) is mere opinion not supported by factual evidence. The Examiner has submitted numerous other arguments in response to the Applicants' arguments including an argument that aerosol into a APGD is known in the art (with reliance upon additional references such as Wang et al., arguments that Applicants have failed to point out any structural differences between the claimed limitations and the prior art apparatuses to Kolluri, arguments supporting modification of the electrodes of Kolluri with a dielectric coating that is disclosed in Roth et al., arguments against the intended use of the of the apparatuses of Kolluri and Roth et al. as a basis for negating combination of these references, and arguments to support obviousness of the orientation of the electrodes and the benefits of the ability of the claimed arrangement to isolate the atomized liquid or solid under gravity through the intended plasma regions.

Applicants' Response to Examiner's Further Arguments

The Applicants respectfully object to the numerous arguments that the Examiner has set forth on the bases that:

1) The Examiner has, for the most part, deviated from proper methodology for establishing obviousness rejections of the instant claims;

2) The Examiner has failed to give proper credence to the Applicants' prior arguments for purposes of determining how a person of ordinary skill would have understood the teachings of Kolluri, and for purposes of determining what a person of ordinary skill would have known or could have done with the teachings of Kolluri in view of the further teachings of Roth et al.;

3) U.S. Patent No. 7,455,892 (submitted in an IDS for the instant application as U.S. Pub. No. 2004/0022945) has issued based on novelty and non-obviousness of atomizing a liquid and/or solid-coating forming material into the same type of plasma taught in Roth et al.; and

4) Many of the Examiner's further arguments are clearly indicative of impermissible hindsight reconstruction of the instant invention as claimed.

The individual bases of argument as outlined above are set forth in further detail below. The Applicants note that proper application of obviousness standards, especially as those standards apply to the instant claims, was set forth in the Response filed on June 18, 2008. Therefore, the Applicants do not repeat the standards herein. However, the Applicants note that, in the wake of *KSR*, it is clear that neither the Office nor Applicants can be restricted to bright-line tests for purposes of proving or disproving obviousness of a claimed invention. In fact, numerous "exemplary rationales" with detailed instructions for properly establishing obviousness of claims are enumerated in the MPEP; however, such exemplary rationales are rarely followed by Examiners due to the non-binding nature thereof.

The Applicants submit that there is no substantial disagreement with the Examiner's application of the Graham factual inquiries. The point of disagreement between the Office and the Applicants is ultimately what a person of ordinary skill in the pertinent art **would have known at the time of the invention, and on what such a person would have reasonably expected to have been able to do in view of that knowledge** (emphasis added, see MPEP 2141(II.). The Applicants remind the Examiner that the above standard cannot be avoided by using shortcuts or pre-*KSR* case law that may no longer be consistent with the above standard; any argument on the part of the Examiner must be in accordance with the above standard and must accurately reflect what one of skill in the art would reasonably have expected to have been able to do in view of knowledge available at the time of the invention at issue.

In view of the above framework, the Applicants now further explain the bases for argument against the Examiner's maintained rejections.

1) The Examiner has Deviated From Proper Methodology for Establishing Obviousness Rejections of the Instant Claims

The Examiner has chosen to rely upon Kolluri and Roth et al. to establish the instant obviousness rejections of the claims. By doing so, the Examiner **must weigh the combined teachings of these references for all that one of skill in the art would be taught from the combined teachings**. While the Examiner is clearly not bound to an interpretation of either Kolluri or Roth et al. that would require bodily incorporation of the references into each other (the person of skill in the art is *not* an automaton), **the Examiner's analysis is required to interpret these references in accordance with how a person of ordinary**

skill would have understood the teachings of Kolluri and Roth et al., and what a person of ordinary skill would have known or could have done with the teachings of Kolluri in view of the further teachings of Roth et al.

The Applicants recognize that the determination of how one of skill in the art would have interpreted the teachings of Kolluri and Roth et al. is not limited to the express teachings thereof, but can also be supplemented with other teachings in the art, which may come from other references. However, proper methodology to reject claims by relying upon such additional references requires a clear recitation to place the Applicants on notice of the specific teachings in the art that the Examiner believes would have directed one of skill in the art to practice the claimed invention. The Examiner's continued recitation of the rejections as *only* being over Kolluri and Roth et al., especially in view of clear facts that prove these references are inconsistent with each other in terms of the technology involved, and then reliance upon other references in the "Response to Arguments" section of the final Office Action is confusing and does not place the Applicants on proper notice as to the actual references over which the instant claims are rejected.

The Applicants respectfully request the Examiner to more clearly recite the rejections of the instant claims that rely upon additional references other than Kolluri or Roth et al., and the Applicants respectfully request the finality of the instant Office Action to be withdrawn so that Applicants can have an opportunity to address such new rejections.

2.) Interpretation of Prior Applicant Arguments

Because the prior rejections of independent claim 1 from the Examiner were over Kolluri and Roth et al. **alone**, the Applicants' prior arguments were directed to **how** one of

skill in the art would have interpreted the combined teachings of these references. The Declaration that was submitted, as well as Exhibit A to Park et al. and the accompanying arguments, was intended to prove why one of skill in the art would **not** have interpreted the combined teachings of Kolluri and Roth et al. in the manner proposed by the Examiner. The Applicants were not necessarily submitting arguments that were commensurate in scope with the instant claims; after all, the Applicants were engaged in performing the proper analysis of determining what was known to those of ordinary skill in the art in view of the combined teachings of Kolluri and Roth et al. All of the Applicants' arguments were **very relevant** to how one of skill in the art would have interpreted the combined teachings of Kolluri and Roth et al., and to what one of skill in the art would reasonably have been expected to do in view of the combined teachings of Kolluri and Roth et al., including any teachings away from such combination.

The Examiner's over-reliance upon any disconnect between the analysis of the combined teachings of Kolluri and Roth et al. relative to the instant claims obscures the ultimate analysis, which is **how** would one of skill in the art interpret the combined teachings of such references, and **what** would one of skill in the art reasonably have been expected to do in view of such combined teachings.

The Applicants **still maintain** that the prior arguments and evidence set forth in the Response filed on June 18, 2008 are dispositive of the fact that one of skill in the art would **not** have replaced the plasma of Kolluri with the plasma taught by Roth et al., and the further arguments and references relied upon by the Examiner fail to establish otherwise. To explain, the instant obviousness analysis **still hinges** on <u>how</u> one of skill in the art would

have interpreted the combined teachings of Kolluri and Roth et al., and what one of skill in the would have been expected to do with those teachings. Thus, if there are factors that were known or generally accepted by those of skill in the art at the time of the instant invention that would have directed one of skill in the art **away** from combining the teachings of Kolluri and Roth et al. at the time of the instant invention, such factors are clearly relevant to the determination of what one of skill in the art would have done in view of the combined teachings of Kolluri and Roth et al. Logically speaking, intended use of the apparatuses taught by both Kolluri and Roth et al. have a strong effect on what one of skill in the art would be expected to do in view of the teachings of Kolluri and Roth et al. For example, with clear teachings in Kolluri that the plasma apparatus is designed to operate in a vacuum, strong evidence is necessary on the part of the Examiner to prove why this teaching of Kolluri would **not** be followed.

The previously-submitted Declaration and Exhibit A to Park et al. were submitted to establish the difficulty associated with producing stable atmospheric pressure glow discharge (APGD), and to establish the fact that the apparatus of Kolluri is incapable of producing APGD. This evidence was **not** submitted to argue that APGD was unknown at the time of the instant invention, but was rather submitted to show the difficulties that a person of skill in the art would recognize with regard to the ability to produce a stable APGD, and to prove that modification of stable APGD (such as by introduction of an atomized liquid or solid instead of a gas) **would be looked upon with much skepticism by those of skill in the art at the time of the instant invention**.

Clearly relevant is the fact that Roth et al. is directed to a **steady-state, glow discharge plasma** in which a uniform plasma is produced without filamentary discharges (see Abstract and column 2, lines 46-52). Roth et al. also teaches that the APGD is a **low power density glow discharge plasma** (see column 1, lines 20-22), as contrasted to high temperature or "hot" plasmas (see column 1, lines 29-34). It is apparent from the teachings of Roth et al. that the inventors thereof recognized the difficulty associated with achieving a **stable** APGD that is also a low power density APGD, as evidenced by statements in the Background of the Invention thereof. The invention of Roth et al. was directed to construction and operation of such a plasma. Notably, the apparatus of Roth et al. is **only** taught to use gas, and there is no teaching of any ability to introduce a liquid precursor into the plasma generated by the apparatus. Given the numerous considerations associated with construction and operation of the plasmas taught in Roth et al., contrasted with the completely different types of plasmas that are produced in accordance with Kolluri, very strong evidence is clearly necessary for the Examiner to support modifying the different types of plasma devices by way of mixing and matching various features thereof (as the Examiner has done by modifying the apparatus of Kolluri with features of the apparatus taught by Roth et al.). The fact that Roth et al. recognizes that covering an electrode on all sides discourages arcing from the edges or back side of the electrode plates in the context of the disclosed apparatus and plasma produced thereby does **nothing** to apprise one of skill in the art that such a feature could be applied to an apparatus that does not even employ a dielectric plate (such as the apparatus of Kolluri), and that *clearly* is not intended to produce the same type of plasma under conditions of atmospheric pressure. The effects of any such

modifications on operation of the respective apparatuses cannot be ignored for risk of rendering the apparatuses useless for their intended purposes, which is clearly impermissible.

Because Roth et al. teaches a steady-state, glow discharge plasma that is also a low power density APGD, the Applicants respectfully submit that none of the arguments set forth by the Examiner, or the art relied upon to support such arguments, suggests that one of skill in the art would reasonably have been expected to replace the plasma in Kolluri et al. (or to modify the apparatus taught by Kolluri) based on any of the teachings in Roth et al.

The Examiner has relied heavily upon Wang et al. to support the idea that use of atomized liquid in APGD is known in the art. Importantly, all of the so-called "glow" discharges referred to by Wang et al. operate under high temperatures as made clear in the attached Declaration that was executed by Dr. Liam O'Neill, an expert in plasma technologies, and submitted for a related application (see Paragraphs 9. and 10. of the Declaration). The "low power density" plasmas of Roth et al. are clearly **not** high temperature plasmas, and the attached Declaration makes clear that such plasmas were not enabled until 1989 (low power density plasmas are the same as the "cold" plasmas referred to in the Declaration). Notably, each of the references relied upon by Wang for teaching plasmas that are suitable for use therein were published before 1989. Therefore, it is clear that Wang does not teach use of atomized liquid in the types of APGD as taught by Roth et al., and Wang does nothing to change the general mindset of those of skill in the art at the time of the instant invention that APGD of the type taught in Roth et al., in particular, were dry processes.

The above arguments, in view of the Declaration of Dr. O'Neill, are very relevant to the understanding of **how** one of skill in the art would have interpreted the combined teachings of Kolluri and Roth et al. (and Wang et al.), and on what one of skill in the art would reasonably have been expected to do in view of such teachings. In particular, the Applicants respectfully submit that the confluence of all such arguments and evidence is overwhelming proof that one of skill in the art would **not** have supplemented the teachings of Kolluri with the teachings of Roth et al. in any way, and that one of skill in the art **clearly** would not have arrived at the instant invention as claimed based on the combined teachings of Kolluri and Roth et al.

Contrary to the Examiner's views that the Applicants are attacking the references individually, this is not the case; the Applicants are merely interpreting the references in their entirety for purposes of determining how one of skill in the art would have interpreted the references. After all, without full knowledge of what a reference teaches, one of skill in the art clearly would be incapable of determining whether or not there is a teaching within such reference that would teach away from making an otherwise desired combination.

3.) Issuance of U.S. Patent No. 7,455,892

Particularly relevant to the Applicants' arguments against the obviousness rejections over Kolluri and Roth et al. is the fact that the '892 patent issued in view of the teachings of these references. To explain, the claims in the '892 patent are generally directed to a process of introducing an atomized liquid and/or solid-coating forming material into a homogeneous APGD and exposing a substrate to the atomized material after exposure of the material to the plasma. The atomized material is still in atomized form after exposure to the

plasma. As such, the claims in the '892 patent were distinguishable from the teachings of Wang et al., which taught vaporization of the atomized liquid in the plasma due to the fact that all plasmas taught therein are "hot" plasmas (which was supported by the Declaration of Dr. O'Neill and which is submitted herewith). There was no knowledge available at the time of the instant invention to suggest that liquid could be atomized into a so-called "cold" plasma, which is the type of plasma taught by Roth et al., with expected success and all of the prior art teaches vaporization of any liquid precursor, either in the plasma flame or through use of vacuum. Thus, the findings by the Office that resulted in issuance of the '892 patent equally apply to prove that one of skill in the art would not have reasonably been expected to have been able to combine Kolluri and Roth et al. in the manner proposed by the Examiner to establish the instant rejections. Thus, the rejections that rely upon combination of Kolluri and Roth et al. must be withdrawn.

4.) Impermissible Hindsight Reconstruction of the Instant Invention

The Applicants respectfully submit that the structural differences between the claimed apparatus and the apparatus of Kolluri are clear; the claimed apparatus includes a dielectric plate disposed between the electrodes, whereas Kolluri includes no such plate. Further, there is no atomizer in Kolluri that is adapted to introduce an atomized liquid into **one** of the first and second plasma regions. For the Examiner to find otherwise, absent any teaching in the art whatsoever of any desirability to do so, can only be the result of impermissible hindsight reconstruction of the instant invention as claimed. In particular, the Examiner has pointed to nothing within the art to suggest a desirability to arrange the electrodes as claimed, in combination with arranging the atomizer in the manner claimed,

which has the effect of conveniently isolating the atomized liquid or solid under gravity through the intended plasma regions. Statements such as "the Applicants have recognized another advantage that would flow naturally from following the suggestions of the prior art cannot be the basis for patentability" are clearly conclusive and do not rise to the level necessary to prove that such features are obvious. In fact, the apparatus of Kolluri clearly contains no structure that prevents the atomized liquid from going to locations other than the plasma region, whereas the instant invention is capable of accomplishing such a result (refer to Figure 1 of the instant application, contrasted with Figure 5 of Kolluri that shows delivery nozzles located at positions that are clearly outside of the plasma region between electrodes 78).

In view of the foregoing, the Applicants respectfully request the Examiner to reconsider the rejections of independent claim 1, as well as the claims that depend therefrom, under 35 USC §103(a) over the combined teachings of Kolluri and Roth et al.

Rejections Relying Upon the Combination of Kolluri, Roth et al., and Rickerby et al. or O'Reilly et al.

The Applicants respectfully submit that, in view of the foregoing traversal of the rejections over the combination of Kolluri and Roth et al., the rejections further relying upon Rickerby et al. or O'Reilly et al. are also overcome.

Provisional Obviousness-Type Double Patenting Rejections

The Applicants note that the obviousness-type double patenting rejection over co-pending U.S. App. No. 10/510555 is only a provisional rejection. Therefore, the Applicants expect that such provisional obviousness-type double patenting rejection will be held in

abeyance until there is an indication of allowability of either the instant application or the '555 application.

In view of the foregoing, the Applicants respectfully submit that each of the instant rejections have been overcome such that independent claim 1, as well as the claims that depend therefrom, is in condition for allowance, which allowance is respectfully requested.

This Response is timely filed; thus, it is believed that no fees are presently due. Further, this Response is submitted within the 2-month period for response after a final rejection However, the Commissioner is hereby authorized to charge any additional fees or credit any overpayment to our Deposit Account No. 08-2789.

Respectfully submitted,

HOWARD & HOWARD ATTORNEYS, P.C.

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